

FILE
COPY

CLASSIFICATION **CONFIDENTIAL**

CENTRAL INTELLIGENCE AGENCY
INFORMATION FROM
FOREIGN DOCUMENTS OR RADIO BROADCASTS

REPORT

50X1-HUM

CD NO.

COUNTRY

USSR

DATE OF

INFORMATION 1949

SUBJECT

Scientific - Geophysics, prospecting

DATE DIST. 12 Apr 1951

HOW

PUBLISHED

Book

WHERE

PUBLISHED

Leningrad

NO. OF PAGES 6

DATE

PUBLISHED

1949

LANGUAGE

Russian

SUPPLEMENT TO
REPORT NO.

THIS DOCUMENT CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENSE
OF THE UNITED STATES WITHIN THE MEANING OF ESPIONAGE ACT 80
U. S. C., 31 AND 32, AS AMENDED. ITS TRANSMISSION OR THE REVELATION
OF ITS CONTENTS IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PRO-
HIBITED BY LAW. REPRODUCTION OF THIS FORM IS PROHIBITED.

THIS IS UNEVALUATED INFORMATION

SOURCE

Obshchiy Kurs Razvedochnoy Geofiziki (dlya Tekhnikumov),
Gostoptekhizdat, pp 408

50X1-HUM

TABLE OF CONTENTS FOR
"A GENERAL COURSE IN GEOPHYSICAL PROSPECTING"

The above book was written by a group of authors under the
general editorship of L. V. Sorokin, Doctor of Physicomathemati-
cal Sciences. Section I, "Gravimetric Prospecting," was written
by L. V. Sorokin; Section II, "Magnetic Prospecting," by B. I.
Maksimov; Section III, "Electrical Prospecting" -- Chapters XI,
XIII, and XIV, by Ye. N. Kalenov, and Chapter XII, by S. D. Tse-
kov; Section IV, "Seismic Prospecting" -- Chapters XV through
XVIII, by L. A. Ryabinkin, and Chapters XIX through XXIII, by
A. N. Fedorenko; and Section V, "Industrial Geophysics," by
S. G. Komarov.

TABLE OF CONTENTS

Page

Introduction

Section I. Gravimetric Prospecting

Chapter I. The Physical Principles of Gravimetric Prospecting

- | | |
|---|----|
| 1. Gravitational Force | 9 |
| 2. Gravitational Potential. The Level Surface and the Geoid | 11 |
| 3. Formulas for Normal Gravitational Force; Gravity Anomalies | 13 |
| 4. Second Derivatives of Gravitational Potential | 15 |

Chapter II. Determinations of Gravitational Force Using a Pendulum

- | | |
|--|----|
| 5. Accuracy Required of Gravitational Force Determinations in
Gravimetric Prospecting | 18 |
| 6. Absolute Determinations of Gravitational Force | 19 |
| 7. Relative Determinations of Gravitational Force | 21 |

- 1 -

CONFIDENTIAL

EVALUATE

CLASSIFICATION

CONFIDENTIAL

STATE	<input checked="" type="checkbox"/> NAVY	<input checked="" type="checkbox"/> HSRB	DISTRIBUTION														
ARMY	<input checked="" type="checkbox"/> AIR	<input checked="" type="checkbox"/> FBI															

CONFIDENTIAL
CONFIDENTIAL

50X1-HUM

	<u>Page</u>
8. Pendulums for Relative Determinations of Gravitational Force	23
9. The Optical Counter for Determining the Period of Pendulum Vibrations	30
10. Corrections to the Observed Period of Pendulum Vibrations	36
11. Installation of a Pendulum and Observations of It	43
Chapter III. Relative Determinations of Gravitational Force With the Help of Gravimeters	
12. General Information on Gravimeters	50
13. The Molodenskiy Gravimeter	54
14. The Neergard Quartz Gravimeter	61
Chapter IV. Determination of Second Derivatives of Gravitational Potential	
15. Basic Equations of the Gravitational Variometer	65
16. Operating Principle of Gravitational Variometers	69
17. Production and Processing of Observations With the Gravitational Variometer	76
Chapter V. Corrections for Observed Values of Gravitational Force and Second Derivatives of Gravitational Potential	
18. Corrections (Reductions) of Gravitational Force Values	82
19. Corrections for the Effect of Local Topography Upon the Readings of the Gravitational Variometer	87
20. Anomalies of Gravitational Force and of the Second Derivatives of Gravitational Potential	89
Chapter VI. Basic Information on Gravimetric Surveys and Their Interpretation	
21. Various Types of Gravitational Surveys and the Conditions Under Which They Can Be Used	95
22. Interpretation of the Results of Gravimetric Surveys	100
23. Use of Gravimetric Prospecting for Oil Explorations	102
Section II. Magnetic Prospecting	
Chapter VII. The Physical Principles of Magnetic Prospecting	
24. Laws of Interaction of Magnetic Masses	106
25. The Magnetic Field of Magnets	108
26. Interaction of Magnets	111
27. Magnetic Characteristics of Rocks	112
Chapter VIII. Elements of Terrestrial Magnetism and Their Measurement	
28. Elements of Terrestrial Magnetism	114
29. The Normal and Anomalous Geomagnetic Field	116
30. Gradient of the Geomagnetic Field	118
31. Magnetic Variations	119

CONFIDENTIAL

CONFIDENTIAL

CONFIDENTIAL

CONFIDENTIAL

50X1-HUM

Page

Chapter IX. The Theory and Practice of Measurements With Magnetic Variometers

32. The Theory of Magnetic Variometers	121
33. Description of Z-Variometers	123
34. Theory and Description of H-Variometers	126
35. Preparation of Variometers for Field Work	128
36. Production of Measurements	135
37. Processing Data Obtained by Magnetic Prospecting	137

Chapter X. Illustrations of Magnetic Surveys

38. Types of Magnetic Surveys	142
39. Examples of Magnetic Surveys	144
40. The Aerial Magnetic Survey	149

Section III. Electrical Prospecting

Chapter XI. The Resistivity Method

41. Basic Information on the Method	150
42. Resistivity of Rocks	153
43. The Normal Electric Field. Potential of Fields Created by One-Point and Two-Point Electrodes	154
44. Potential of the Field on the Surface of a Medium. Determination of Resistivity of the Medium	158
45. Methods of Measuring Resistivity of the Medium. The Concept of Apparent Resistivity	161
46. Instruments Used in the Resistivity Method	163
47. Vertical Electrical Sounding	173
48. Interpretation of Results of Vertical Electrical Sounding	179
49. Electrical Profiling	195
50. Circuits and Techniques Used in Electrical Profiling	197
51. Map of Resistances. Interpretation of Electrical Profiling Results	203

Chapter XII. The Method of Natural Electrical Currents

52. Physical Principles of the Method	205
53. Instruments and Techniques Used in Field Observations. Interpretation of Results	208

Chapter XIII. The Method of Loops (Spires)

54. Physical Principles of the Method	213
55. Methods Used in Field Measurements	218
56. Instruments and Techniques for Field Work	221
57. Processing and Interpretation of Results	223

Chapter XIV. Other Prospecting Methods Using Alternating Current

58. The Equipotential Line Method	226
59. The Intensity Method	227
60. The Induction Method	228

- 3 -

CONFIDENTIAL

CONFIDENTIAL

CONFIDENTIAL

CONFIDENTIAL

50X1-HUM

Page

Section IV. Seismic Prospecting

Chapter XV. Physical Principles of Seismic Prospecting

61. Elements Characterizing the Elastic Properties of Rocks	230
62. Origin and Types of Elastic Seismic Waves	231
63. Movement of an Individual Seismic Wave	232
64. Propagation and Velocity of Seismic Waves	233
65. Apparent Velocity of Seismic Waves	235
66. Reflection of Seismic Waves	235
67. Refraction of Seismic Waves	237
68. Origin and Propagation of a Refracted Wave Which Emerges on the Surface	238
69. The Sequence in Which Various Types of Waves Emerge Upon the Surface. Seismic Registration. The Hodograph	240
70. The Theory and Practice of Seismic Prospecting	242

Chapter XVI. Geological Principles Governing the Use of Seismic Prospecting

71. Velocity of Propagation of Elastic Waves in Various Rocks	243
72. Reflecting and Refracting Boundaries in a Rock Stratum	244
73. Geological Conditions Governing the Excitation, Propagation, and Reception of Seismic Waves	247

Chapter XVII. Principles for Registration and Separation of Reflected and Refracted Waves

74. Registration of Soil Oscillations	249
75. Separation of Reflected and Refracted Waves	252

Chapter XVIII. Seismic Instrumentation and Its Control

76. The Modern Electromagnetic Seismograph With Oil Damping and Its Regulation	256
77. The Modern Seismic Amplifier	259
78. The Automatic Amplitude Regulator	265
79. The Semiautomatic Amplitude Regulator	267
80. The Mixer	271
81. The 12-Channel Oscillograph	273
82. Auxiliary Instrumentation of a Seismic Station	280
83. Scanning a Profile by a Seismic Station and Obtaining a Seismic Tape	283

Chapter XIX. Field Observations of Seismic Waves

84. Introductory Remarks	285
85. Conditions Governing the Excitation of Seismic Waves	287
86. Conditions Governing the Registration of Seismic Waves	289
87. The Optimal Distance Between Explosion Points and Seismographs	291

Chapter XX. Hodographs of Seismic Waves

88. Definition of a Hodograph (Time-Distance Curve)	293
89. Hodographs of Direct Waves	293
90. Hodographs of Reflected Waves	294

- 4 -

CONFIDENTIAL

CONFIDENTIAL

CONFIDENTIAL

CONFIDENTIAL

50X1-HUM

	<u>Page</u>
91. Hodographs of Refracted Waves	296
92. Relationship Between Hodographs of Direct, Reflected, and Refracted Waves	298
93. Hodographs of the First Tremors	300
94. Comparison of Hodographs	300
 Chapter XXI. Interpretation of Hodographs	
95. Interpretation of Hodographs of Reflected Waves	302
96. Interpretation of Hodographs of Refracted Waves	305
97. Complex Surfaces (Boundaries) of Separation	310
98. Geological Interpretation	311
99. Determination of Average Velocities	313
 Chapter XXII. Systems of Observation	
100. Systems of Observation of Reflected Waves	315
101. Systems of Observation of Refracted Waves	321
 Chapter XXIII. Examples of Seismic Prospecting	
102. General Tasks of Seismic Prospecting	323
103. Anticline Structures Formed and Covered by Sandy-Clayey Rocks	324
104. Salt Dome Structures. The Surface of the Crystalline Foundation	328
 Section V. Industrial Geophysics	
 Chapter XXIV. Electrical Well-Logging	
105. Basic Concepts	335
106. Conducting the Logging	346
107. Automatic Registration	347
108. Various Interferences	350
109. Resistivity of Rocks	352
110. Resistance Curve	354
111. Influence of the Well and Width of the Seam	358
112. Sondes	361
113. Lateral Logging	362
114. The PS-Curve	364
115. Use of Electrical Well-Logging	367
 Chapter XXV. Other Forms of Carottage	
116. Radioactive Carottage	376
117. Use of Radioactive Carottage	378
118. Mechanical Carottage	379
119. Luminescent and Gas Carottage	380
120. Thermal Carottage	382
 Chapter XXVI. Some Operations in Wells	
121. Measurement of Resistance of the Liquid	383
122. Temperature Measurements	384
123. Calipers	389

CONFIDENTIAL

CONFIDENTIAL

CONFIDENTIAL

CONFIDENTIAL

50X1-HUM

	<u>Page</u>
124. Determination of the Liquid Level	389
125. Determination of Well Curvature	390
126. Breaking and Separation of Soils	394
Chapter XXVII. Equipment	
127. Winches	397
128. Block and Tackle Gear	398
129. Cable	399
130. The Carottage Station	400
Subject Index	402

- E N D -

- 6 -

CONFIDENTIAL

CONFIDENTIAL